Mapping Of Research Productivity Of Icar Scientists A Scientometric analysis

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1. INTRODUCTION

Indian Council of Agricultural Research (ICAR), a country's top organization, is aimed to achieve sustainability in growth and production of agricultural sector. The ICAR has prepared an innovation driven strategy for improving the efficiency and effectiveness for enhancing production and diversifying the Indian agriculture. ICAR plays an important role in achieving food security, poverty alleviation and green revolution. It encourages the education and research in the diversifying Indian agricultural field and promoting innovations for enhancing national wealth. The four Deemed to be Universities are recognized under ICAR are Indian Agricultural Research Institute (IARI), Indian Veterinary Research Institute (IVRI),National Dairy Research Institute (NDRI) and Central Institute of Fisheries Education (CIFE). According to Braun et al. (1987) Scientometric analyzes the quantitative aspects of the generation, propagation and utilization of scientific information in order to contribute to a better understanding of the mechanism of scientific research activities.The present study is conducted to analyze the research publications output of ICAR- Deemed Universities using scientometric techniques to explore the research performance of the organizations and also try to point out some areas for future improvements.

1.1. REVIEW OF LITERATURE

Kappi and others (2021) studies the research output of Universities with Potential for excellence in Particular Area Status in Karnataka State have studies based on the Web of Science database during 2010-2019. The total 8952 documents were analyzed using Bibliomterix R packages and visualization done by VOS Viewer. The study were aimed to examine the year wise productivity, discipline wise research, productive authors, highly cited papers and most occurred keywords. It is resulted that the multi-authored papers have greater research influence in receiving citations.

Pandya and others (2021) have analyzed the research productivity of 12 newly established universities in India during 2010-2019 based on the literature published in Scopus database. The objective of the study was to identify different subject domain, citation pattern and the impact of research in the national and global context. The 3927 articles were analyzed using Bibliomterix R packages. The study revealed that all the universities under study exhibit a significant increase in research productivity during the last ten years.

Several scientometric studies were conducted in different subjects. Compared to subject wise studies there is relatively less studies were done based on institution studies and also in the field of agricultural research few studies were found. A gap can be seen in the field of agriculture pertaining to ICAR. The present study aimed to assess the scientific productivity of ICAR-Deemed Universities statistically.

1.2. STATEMENT OF THE PROBLEM

Scientific production is an individual's or institution's or country's contribution to the world of scientific knowledge. Indian Council of Agriculture Research- Deemed University plays an important role in promoting higher education of Indian agriculture. The research output is considered as a gauge of the performance of the institution.So the researcher intends to study the research productivity of four ICAR-Deemed Universities to understand whether the deemed universities engage in quality research in diverse disciplines and provide qualitative research output.

1.3. SIGNIFICANCE OF THE STUDY

Research productivity is an important gauge to determine the ranking of universities. Compared to scientific subjects recently less scientometric studies are carried out in the field of agriculture. ICAR is the pioneering institution of agriculture in India. Recognizing the pivotal role, UGC was authorized four of its institutions as Deemed to be Universities. Those institutions recognized as deemed universities will be monitored by UGC. Thus the communication of research productivity of ICAR scientists will be useful for the researchers and academicians pursuing research in agriculture and related fields and also at the institution level.

1.4. OBJECTIVES OF THE STUDY

1. To analyze the research productivity of ICAR Deemed University scientists published during 1989-2020 based on the Web of Science database.
2. To compare the growth of literature of research publications of ICAR Deemed Universities.

3. To assess the Authorship Pattern and Degree of Collaboration of ICAR Deemed University scientists.
4. To scrutinize Collaborative Coefficient and Modified Collaborative Coefficient.
5. To calculate the Activity Index, International Collaboration and Domestic Collaboration.
6. To examine the various indices of individual performance of authors.
7. To find out the forms of communications and language wise distribution of research.
8. To identify the most collaborative countries and institutions in research with ICAR-Deemed Universities.
9. To examine the applicability of Lotka's Law of Author Productivity.
10. To spot the most productive journals preferred by the ICAR-Deemed University scientists.
11. To analyze the citation pattern of publication output of ICAR Deemed University scientists.
12. To apply the Bradford's Law of Scattering in the research output of ICAR scientists.
13. To test the applicability of Zipf's Law to the literature of ICAR Deemed University.
14. To visualize the collaboration and co-citations network of research publications.
15. To suggest a plan of action to improve research and developments in the research fields of ICAR Deemed Universities.

1.5. HYPOTHESIS OF THE STUDY

1. The relative growth rate shows a declining trend while doubling time increases.
2. There is no correlation between the number of publications and number of funded research.
3. The most productive deemed university has the more activity index.
4. There is no significant correlation between citation and international collaborative authors.

5. There exists a positive correlation between the number of countries in a continent and number of papers published.
6. The Lotka's Law of scientific productivity does not confirms for the publication output of ICAR scientists.
7. The Bradford's Law of scattering fits for publications of all the Deemed Universities of ICAR.
8. The applicability of Zipf's Law confirms for the research output produced by ICAR scientists.

1.6. METHODOLOGY

The analysis was based on the research output published in the Web of Science database during 1989-2020. The Web of Science database covers multidisciplinary contents and is a trusted global citation database, so it is worth depending on for citation study. The search string used to extract data were "Organization Enhanced" and searched the publication of each deemed university using ICAR-Indian Agricultural Research Institute, ICAR-Indian Veterinary Research Institute, ICAR-National Dairy Research Institute and ICAR-Central Institute of Fisheries Education and the Timespan= 1989-2020.

The data were collected in February 2021. A total of 19990 data were retrieved. The researcher downloaded 42 Plain text files for Bibexceland Biblioshiny analysis and 42 Tab-delimited (Win) text files for VOS Viewer visualization. The statistical and mathematical calculations were performed using IBM SPSS Statistics and MS-Excel.

1.7. SCOPE AND LIMITATIONS

The data collection is based on the Web of Science database during the period 1989-2020 (32 years). The scope of the study encompasses the research output of four ICAR-Deemed universities which are Indian Agricultural Research Institute, New Delhi, National Dairy Research Institute, Karnal, Indian Veterinary Research Institute, Izatnagar and Central Institute on Fisheries Education, Mumbai.

1.8. TOOLS AND TECHNIQUES

- Scientometric Indicators
- Bibliometric Laws- Lotka's Law, Bradford's Law and Zipf's Law
- Chi-square Test
- KS-test
- Spearsman's correlation

1.9. CHAPTERIZATION

Report of the present study is presented in four chapters. The preliminary part are also included at appropriate places. The respective chapters are given below.

Chapter I begins with the **Introduction** of Agriculture research and insights into scientometrics. It contains statement of the problem, significance and scope of the study

Chapter II explores the related **Review of Literature** based on particular institution journals and specific subjects.

Chapter III deals with the **Research Design** framed for the study which includes Objectives, Hypotheses, Methodology, Bibliometric Software, Scientometric Indicators, Bibliometrics Laws, Statistical Tools and limitation of the study.

Chapter IV gives a brief **Profile of ICAR-Deemed Universities** under study

Chapter V presents the **Data Analysis and Interpretation** based on the framed objectives using various tools.

Chapter VI contains **Findings and Conclusion**, tenability of hypothesis, suggestions for improvement and suggestions for future research.

Bibliographylists out all the references used for the study

Appendixcontains the research publications of researcher.

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